

## REMARKS

Claims 1-13, 16-28 and 31-36 are now pending in the application. By this paper, Claims 1 and 16-21 have been amended. The basis for the foregoing amendments can be found throughout the specification, claims, and drawings originally filed. No new matter has been added. The preceding amendments and the following remarks are believed to be fully responsive to the outstanding Office Action and are believed to place the application in condition for allowance. The Examiner is respectfully requested to reconsider and withdraw the rejections in view of the amendments and remarks contained herein.

## REJECTION UNDER 35 U.S.C. § 102

Claims 1, 2, 5, 8, 16, 17, 20, 23, and 33-36 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Kimura et al. (U.S. Pat. No. 6,386,672). This rejection is respectfully traversed.

Independent Claim 1 recites a droplet discharging apparatus including a means for discharging a discharge liquid in the form of droplets through an aperture by mechanically deforming a piezoelectric element by a normal drive signal, a drive integrated circuit disposed adjacent to and in thermal contact with the piezoelectric element, and a control unit that selects between the normal drive signal and a cooling drive signal and supplies the selected normal drive signal or cooling drive signal to the drive integrated circuit. A substrate is attached to and is in thermal contact with the piezoelectric element and drive integrated circuit, a diaphragm is disposed adjacent to and in thermal contact with the piezoelectric element, and a temperature sensor is

associated with the drive integrated circuit for sensing a temperature of the drive integrated circuit. The control unit selects between the normal drive signal and the cooling drive signal based on an approximated temperature of the discharge liquid, whereby the droplets are discharged from the aperture based on the selected normal drive signal or cooling drive signal.

Independent Claim 16 similarly recites a droplet discharging method including sensing a temperature of a drive integrated circuit disposed adjacent to and in thermal contact with the piezoelectric element, approximating a temperature of the piezoelectric element based on the sensed temperature of the drive integrated circuit, approximating a temperature of a diaphragm disposed adjacent to the piezoelectric element, and approximating a temperature of a discharge liquid disposed adjacent to the piezoelectric element based on the approximated temperature of the diaphragm. Independent Claim 16 further recites selecting between a normal drive signal and a cooling drive signal based on the approximated temperature of the discharge liquid and discharging the discharge liquid in the form of droplets through an aperture by mechanically deforming the piezoelectric element based on the selected normal drive signal or cooling drive signal.

Applicants respectfully submit that Kimura fails to disclose a droplet discharging apparatus or method that selects between a normal drive signal and a cooling drive signal based on an approximated temperature of a liquid discharged from the droplet discharging apparatus. Rather, Kimura discloses an inkjet recording head including a nozzle plate (3), a flow path forming substrate (7), a piezoelectric vibrator unit (8), and an elastic plate (10) that are controlled based on a detected temperature of a

semiconductor substrate (67). See Kimura at Col. 8, Ins. 5-13. While Kimura discloses that control of the piezoelectric vibrator unit (8) is based on the detected environmental temperature of the substrate (67), Kimura is completely silent with respect to approximating a temperature of a discharge liquid based on the detected temperature of the semiconductor substrate (67). Furthermore, Applicants respectfully submit that Kimura also fails to disclose selecting between a normal drive signal and a cooling drive signal based on an approximated temperature. First, Kimura discloses adjusting a level of a drive signal based on a *detected* temperature of the substrate (67), not an approximated temperature. See Kimura at Col. 8, Ins. 5-13, and Ins. 40-57. Second, while the level of the drive signal applied to the piezoelectric vibrator unit (8) is adjusted based on the detected environmental temperature, Kimura fails to disclose selecting between a *pair* of signals. Rather, the normal drive signal applied to the piezoelectric vibrator unit (8) is *adjusted*. In contrast, the presenting pending claims recite selecting between a *pair* of signals based on an *approximated* temperature.

In light of the foregoing, Applicants respectfully submit that independent Claims 1 and 16, as well as Claims 2, 5, 8, 17, 20, 23, and 33-36, respectively dependent therefrom, are in condition for allowance. Accordingly, reconsideration and withdrawal of the rejections are respectfully requested.

#### **REJECTION UNDER 35 U.S.C. § 103**

Claims 3 and 18 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Kimura et al. (U.S. Pat. No. 6,386,672) in view of Kubo (U.S. Pat. No. 6,257,688).

Claims 4 and 19 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Kimura et al. (U.S. Pat. No. 6,386,672) in view of Tajika (U.S. Pat. No. 5,861,895).

Claims 6 and 21 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Kimura et al. (U.S. Pat. No. 6,386,672) in view of Nozawa (U.S. Pat. No. 6,499,821).

Claims 7 and 22 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Kimura et al. (U.S. Pat. No. 6,386,672) in view of Mikami (U.S. Pat. No. 4,633,269).

Claims 9, 11-13, 24 and 26-28 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Kimura et al. (U.S. Pat. No. 6,386,672) in view of Usui et al. (U.S. Pat. No. 6,981,761).

Claims 10 and 25 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Kimura et al. (U.S. Pat. No. 6,386,672) in view of Shinoura (U.S. Pat. No. 6,714,173).

Claims 31 and 32 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Kimura (U.S. Pat. No. 6,386,672) in view of Ishizaki (U.S. Pat. No. 6,454,377).

These rejections are respectfully traversed.

Independent Claims 1 and 16 are believed to be in condition for allowance in light of the foregoing remarks. Because Claims 3, 4, 6, 7, 9-13, 18, 19, 21, 22, 24-28, 31, and 32 respectively depend from independent Claims 1 and 16, Claims 3, 4, 6, 7, 9-13, 18, 19, 21, 22, 24-28, 31, and 32 are similarly believed to be in condition for allowance. Accordingly, reconsideration and withdrawal of the rejections are respectfully requested.

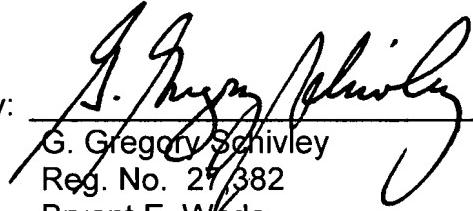
CONCLUSION

It is believed that all of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. Applicants therefore respectfully request that the Examiner reconsider and withdraw all presently outstanding rejections. It is believed that a full and complete response has been made to the outstanding Office Action and the present application is in condition for allowance. Thus, prompt and favorable consideration of this amendment is respectfully requested. If the Examiner believes that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at (248) 641-1600.

Respectfully submitted,

By:

G. Gregory Schivley  
Reg. No. 27,382  
Bryant E. Wade  
Reg. No. 40,344



Dated: August 14, 2007

HARNESS, DICKEY & PIERCE, P.L.C.  
P.O. Box 828  
Bloomfield Hills, Michigan 48303  
(248) 641-1600

GGS/BEW/MHS/ca